

## ABSTRACT

Microbicidal formulations are described which are preferably ecologically friendly and non-toxic to mammals, and are highly effective against a broad spectrum of detrimental pathogenic microorganisms. The microbicidal formulation contains complexes having the formula R-M, wherein R is at least one organic chelating moiety and M is at least one metal ion which is microbicidal to at least one microorganism. These complexes can disrupt microorganism activities by penetrating the natural protecting bio-films of such microorganisms through the reaction of the R-group with the organic constituents of these microorganisms while releasing M into their intra-cellular media. Thus, this process exhibits its biocidal activities from the inside-out, contrary to other methods which rely on damaging the protective biofilms. These microbicidal formulations can be diluted in suitable proportions into aqueous systems to produce the desired dosages for each individual case, depending on the level and the severity of the contamination. The microbicidal formulations can be applied by conventional methods, e.g., spraying, soaking, fogging, impregnation, and the like. The formulations can also be used as preservatives, such as for fresh or cut flowers and plants. These microbiocides can also be made as gel or solids in different forms by using techniques available to those skilled in the art.